Record of *Bodianus rubrisos* Gomon, 2006 from the northern Red Sea, previously misidentified as *B. leucosticticus* (non Bennett) or *B. trilineatus* (non Fowler) (Labridae)

by

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Abstract. – Fishes of the subgenus *Bodianus (Peneverreo)* Gomon, 2006 from the Gulf of Aqaba, northern Red Sea, previously alternatively reported as *Bodianus leucostictus* [sic] (non Bennett, 1832), *B. leucosticticus* (non Bennett, 1832), or *B. trilineatus* (non Fowler, 1934), are reidentified as *B. rubrisos* Gomon, 2006, based on two specimens from Eilat, Israel. These specimens are redescribed. The apparently disjunct distribution of *B. rubrisos* is discussed.

Résumé. – Signalement de *Bodianus rubrisos* Gomon, 2006 dans le nord de la mer Rouge, jusqu'à présent rapporté comme *B. leucostictus* (non Bennett) ou *B. trilineatus* (non Fowler) (Labridae).

Les poissons du sous-genre *Bodianus (Peneverreo)* Gomon, 2006 du golfe d'Aqaba, au nord de la mer Rouge, jusqu'à présent rapportés alternativement comme *Bodianus leucostictus* [sic] (non Bennett, 1832), *B. leucosticticus* (non Bennett, 1832) ou *B. trilineatus* (non Fowler, 1934) sont redéterminés comme *B. rubrisos* Gomon, 2006, en se basant sur deux spécimens d'Eilat, Israël. Ces spécimens sont redécrits. La distribution apparemment disjointe de *B. rubrisos* est discutée.

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The labrid fish genus *Bodianus* Bloch, 1790 is a group of fish living in tropical and warm temperate marine waters of the Atlantic, Indian and Pacific oceans. They are associated with coral or rocky reefs, and occur from tidal pools to depths of 340 m. The genus includes 43 valid species (Gomon, 2006; Eschmeyer *et al*., 2016). It was recently revised by Gomon (2006); within the genus, he created a new subgenus *Peneverreo* Gomon, 2006 from deep reefs (below 50 m depth) of the Indo-West Pacific, recognising the four species *Bodianus leucosticticus* (Bennett, 1832) from the Mascarenes, Taiwan and the Ryukyu Islands, *B. paraleucosticticus* Gomon, 2006 from the southwestern Pacific, *B. rubrisos* Gomon, 2006 from Bali (Indonesia), Taiwan and the Ryukyu Islands, and *B. trilineatus* (Fowler, 1934) from Somalia, Mozambique and South Africa in the western Indian Ocean. Recently, Santini *et al*. (2016) produced a molecular phylogeny of the genus and questioned its monophyly. They proposed to include *Clepticus* Cuvier, 1829 and *Semicossyphus* Günther, 1861 within *Bodianus*.

Baranes and Golani (1993: 310) recorded an unusual species of the genus *Bodianus* from Eilat (Israel), northern Gulf of Aqaba, Red Sea, under the name *Bodianus leucostictus* [sic], based on a single specimen collected in a trammel net at a depth of 200 m. Khalaf *et al*. (1996: 404) reported another specimen of the same species from nearby Aqaba (Jordan), also from deep water ("below 100 m depth".) In a checklist of the marine fishes of Jordan, Khalaf (2004: 43) corrected the name to *B. leucosticticus*. In another list of the deepwater fish of Jordan, Khalaf and Zajonz (2007: 430) reidentified the specimen as *B. trilineatus*.

When another specimen from Eilat (Israel) was collected in deep water on 1 Sep. 2015, doubts were raised concerning its identity with *Bodianus trilineatus*. While the population was first considered to represent an undescribed species, an examination of the two available specimens from the Gulf of Aqaba revealed no significant morphological differences from the species *B. rubrisos* Gomon, 2006, previously known from the eastern Indian Ocean and the Western Pacific. The purpose of the present paper is a redescription and corrected identification species of the subgenus *Bodianus (Peneverreo)*, and to discuss the distribution of *B. rubrisos*.

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METHODS AND MATERIALS

Methods follow Gomon (1997, 2006); measurements follow Hubbs and Lagler (1947). The standard length is abbreviated as SL. The genus and species classification follows Eschmeyer *et al*. (2016); references follow Fricke (2016). The museum abbreviations follow Fricke and Eschmeyer (2016). The distribution map was produced using QGIS Version 2.12.2.

Material has been examined from the Natural History Museum, London, UK (BMNH), Bernice P. Bishop Museum, Honolulu, USA (BPBM), Fish Collection of the Hebrew University, Jerusalem, Israel (HUJ), Northern Territory Museum of Arts and Sciences, Darwin, Australia (NTM), South African Institute for Aquatic Biology, Grahamstown, South Africa (SAIAB), National Museum of Natural History, Smithsonian Institution, USA (USNM).

Comparative materials

Bodianus leucosticticus: BMNH 1856.2.15:00 (holotype of *Labrus leucosticticus* Bennett, 1832, 138 mm SL), Mauritius; SAIAB 421 (holotype of *Lepidaplois bourboni* Fourmanoir & Guézé, 1961, 161 mm SL), La Réunion. *Bodianus paraleucosticticus*: BPBM 36449 (holotype of *Bodianus paraleucosticticus*, 99 mm SL), Rarotonga, Cook Islands. *Bodianus rubrisos*: NTM S.13523-004 (1, paratype, 148 mm SL), Northern Territory, Australia. *Bodianus trilineatus*: USNM 217845 (2, 53-76 mm SL), Somalia, 75-175 m depth; USNM 217876 (1, 121 mm SL), Somalia, 50-70 m depth; USNM 217885 (1, 168 mm SL), Somalia, 78-82 m depth.

Bodianus rubrisos Gomon, 2006

(Fig. 1A, B; Tab. I)

Bodianus rubrisos Gomon, 2006: 53, fig. 34, pl. 5A-C (Singaraja fish market, Bali, Indonesia). Holotype: NTM S.1168-001; Arafura Sea, Northern Territory, Australia; Ryukyu Islands; Taiwan.

Bodianus leucostictus [sic] (non Bennett, 1832): Baranes and Golani, 1993: 310 (Eilat, Israel). Khalaf *et al.,* 1996: 404, pl. 3 (Aqaba, Jordan) [specimen lost]. Khalaf and Disi, 1997: 151 (Aqaba, Jordan).

Bodianus leucosticticus (non Bennett, 1832): Khalaf, 2004: 43 (Jordan, Gulf of Aqaba).

Bodianus trilineatus (non Fowler 1934): Khalaf and Zajonz, 2007: 430 (Jordan, Gulf of Aqaba, deep water). Golani and Bogorodsky, 2010: 77 (Red Sea; in list of invalid records, based on misidentification of *B. trilineatus*).

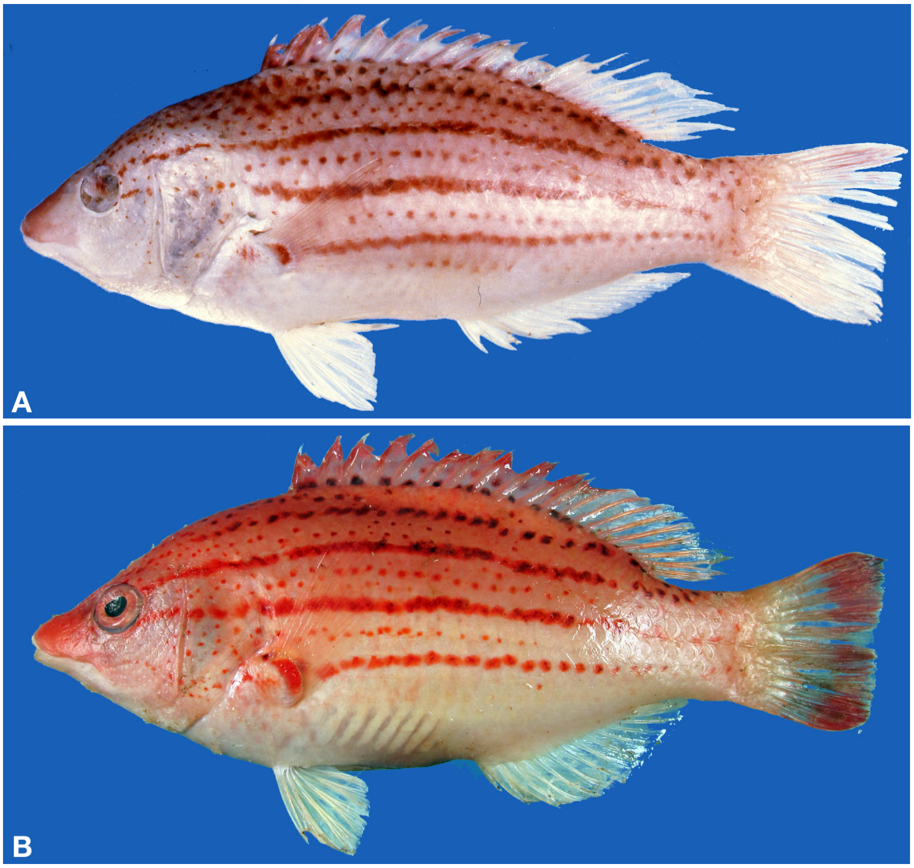

Figure 1. – *Bodianus rubrisos*. **A**: HUJ 13667, male, 190.6 mm SL, Eilat, Gulf of Aqaba, Red Sea, 200 m depth. Photograph Arik Diamant; **B**: HUJ 20530, female, 172.3 mm SL, Eilat, Gulf of Aqaba, Red Sea, 200-300 m depth. Photograph Daniel Golani.

Material

HUJ 13667, male, 190.6 mm SL, Eilat, Israel, Gulf of Aqaba, Red Sea, 200 m depth, trammel net, coll. N. Stopkoper, 15 Jan. 1989. HUJ 20530, female, 172.3 mm SL, off port, Eilat, Israel, Gulf of Aqaba, Red Sea, 200-300 m depth, trammel net, coll. A. Fridman, 1 Sep. 2015.

Table I. – Meristics and morphometrics of the specimens of *Bodianus rubrisos* from the Red Sea.

	HUJ 20530	HUJ 13667
Total length (mm)	211.1	236.4
SL (mm)	172.3	190.6
Sex	female	male
Counts		
Dorsal-fin elements	XII, 10	XII, 10
Origin of first anal spine (opposite dorsal-fin ray)	9th	9th
Origin of pelvic fin (opposite dorsal-fin spine)	1st	2nd
Anal-fin elements	III, 12	III, 12
Pectoral-fin rays	ii, 14	ii, 14
Total gill rakers	15	16
Lateral-line scales	30 + 2	30 + 2
Scales above lateral line	4.5	4
Scales below lateral line	13.5	12.5
Predorsal scales	32	33
Predorsal scales reaching anteriorly to	before anterior nostril	before anterior nostril
Proportions (as percentage of SL)		
HL	38.6	38.7
Snout length	10.0	11.2
Maximum orbital diameter	8.6	7.8
Body depth	43.8	39.8
Caudal-peduncle length	14.1	16.2
Caudal-peduncle depth	16.3	15.5
Predorsal length	42.4	42.1
Dorsal-base length	53.8	53.9
Dorsal-fin length	67.6	67.4
Dorsal-fin spine 1	7.0	6.8
Dorsal-fin spine 2	7.1	9.3
Dorsal-fin spine 12	11.0	13.3
Preanal length	66.0	62.9
Preanus length	61.2	60.2
Anal-base length	24.3	23.4
Anal-fin length	34.3	31.1
Anal-fin spine 1	6.5	8.4
Anal-fin spine 3	12.1	15.0
Pectoral-fin length	22.0	22.3
Pelvic-fin length	17.6	18.7
Caudal-fin length (top)	22.6	22.6
Caudal-fin length (middle)	22.5	22.3

Description

Dorsal-fin rays XII, 10; anal-fin rays III, 12; pectoral-fin rays ii, 14; lateral-line scales 30 + 2; scales above lateral line 4-4½; scales below lateral line 12.5-13.5; predorsal scales 32-33; total gill rakers 15-16. See table I for morphometric values.

Body moderately deep, caudal peduncle of moderate depth; head and snout pointed; dorsal profile of snout and forehead slightly concave in lateral aspect; nape only slightly convex; jaws slightly attenuate. Scaly basal sheath on dorsal and anal fins of moderate height, about 2½ scales in depth; distal outline of sheath gently curved though somewhat straighter posteriorly. Predorsal scales on dorsal midline of head reaching forward to in advance of anterior nostrils.

Posterior tip of dorsal fin rounded, reaching posterior edge of hypurals (caudal-fin base). Posterior tip of anal fin broadly pointed, not reaching posterior edge of hypurals (caudal-fin base). Caudal fin truncate. Pectoral fin with upper rays considerably longer than lower rays; posterior edge of fin straight; fin broadly rounded ventrally.

Colour of fresh adult specimens (Fig. 1A, B). Body pink, white ventrally on head and belly, with numerous horizontal rows of small red to brown dots and four moderately narrow interrupted stripes of similar colour; dorsalmost stripe extending from upper margin of eye and ending below rear base of dorsal fin, the stripe obscured with black; second stripe in about three segments extending from posterior margin of eye and running nearly horizontally at level of anterior portion of lateral line, ending above caudal-fin mid-base; third stripe in about three segments on lateral midline of body on lateral midline of body, originating at ventroposterior margin of eye and running above pectoral-fin base, terminating at caudal-fin mid-base; fourth stripe, comprising a single segment

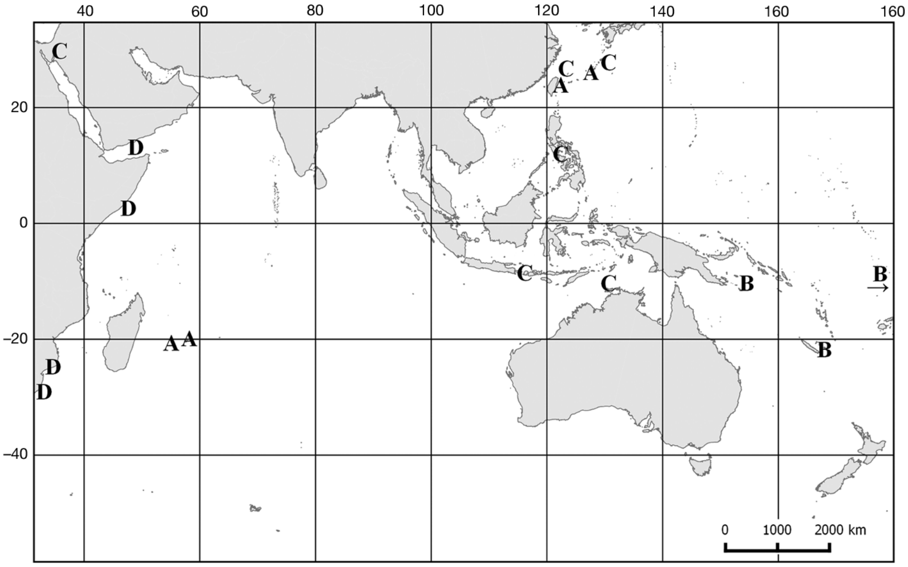

Figure 2. – Geographical distribution of the subgenus *Bodianus (Peneverreo)*. **A**: *B. leucosticticus*; **B**: *B. paraleucosticticus*; **C**: *B. rubrisos*; **D**: *B. trilineatus*.

posterior to pectoral-fin base below middle of side. A single longitudinal row of dots above dorsalmost stripe; two to four rows of dots between first and second stripe, two or three rows between second and third stripe, one row between midlateral and ventralmost, and one or two rows below ventralmost stripe. Opercle and nape with small red spots. Dorsal fin pink with narrow brown basal row of spots on membrane between spines and rays, and few red spots on several interspinous membranes in middle of fin. Anal fin white. Caudal fin distally red, upper margin dark grey. Pectoral fin yellowish with red blotch on fleshy base. Pelvic fin white.

Distribution

Gulf of Aqaba, Red Sea (Israel; Jordan); eastern Indian Ocean (Bali, Indonesia; Northern Territory, Australia); western Pacific (Taiwan; Ryukyu Islands, Japan); two specimens recently collected from the Philippines (CAS 238383: L. Rocha, pers. comm.) (Fig. 2). The species is known in depth ranges of approximately 35-200 m. Underwater photographs of *Bodianus rubrisos* are reproduced in Okamura and Amaoka (1997: 469 as *B. leucostictus*) from a depth of 35 m and in Nishiyama and Motomura (2012: 42) from a depth of 52 m.

DISCUSSION

Three specimens of the subgenus *Bodianus (Peneverreo)* are known from the Gulf of Aqaba, two from Israel and one from Jordan. The Jordanian specimen was deposited in the collection of the Marine Science Station Aqaba (MSSA 35-33/1), but when the first author visited MSSA he was informed that the specimen was lost. Therefore, only the two specimens in HUJ described in the present study are extant. The Jordanian specimen was illustrated in colour by Khalaf *et al.* (1996: pl. 3); the colour pattern well agrees with the specimens from Israel.

The species was originally identified as *Bodianus leucosticticus*, when only two species were known in this species complex (Baranes and Golani, 1993: 310, as *B. leucostictus* [sic]). After Gomon (2006) has revised the genus and described two additional species, reporting *B. trilineatus* from the northwestern Indian Ocean, Khalaf and Zajonz (2007: 430) reidentified the Jordanian specimen as *B. trilineatus*. This identification was taken up by Golani and Bogorodsky (2010: 39), who followed Khalaf and Zajonz (2007) in the conclusion that all previous records of *B. leucosticticus* were based on *B. trilineatus*.

When a second specimen from Eilat, Israel was recently collected, it became apparent that it differed significantly from *B. trilineatus*. Though an undescribed species might have been expected from the northern Red Sea, a closer examination revealed that it was indistinguishable from *B. rubrisos* on morphological grounds.

Counts and proportions of the northern Red Sea specimens are compared with the four species of the subgenus *Bodianus (Peneverreo)* in table II. They well agree with those of *B. rubrisos*, and the colour pattern is identical with the terminal phase of that species. The Gulf of Aqaba specimens are distinguished from *B. trilineatus* by the truncate caudal fin (rounded in *B. trilineatus*), the predorsal scales that reach anteriorly to in advance of the anterior nostril (at most to above the anterior nostril in *B. trilineatus*), longer dorsal fin, a longer predorsal length, a longer caudal peduncle, the terminal phase body colour pattern with four broken red stripes separated by pale spaces containing irregular longitudinal rows of small red dots (with five narrow yellow to red stripes, dorsal three obscured by black separated into

Table II. – Comparison of species in the *Bodianus-leucosticticus* species-group; data of the Indian and Pacific oceans species from Gomon (2006). Values differing from those of *B. rubrisos* are printed in bold face.

	Bodianus rubrisos Red Sea	*Bodianus rubrisos* W Pacific	*Bodianus paraleucosticticus*	*Bodianus leucosticticus*	*Bodianus trilineatus*
Dorsal-fin elements	XII, 10	XII, 10	XII, 10	XII, 10	XII, 10
Origin of first anal spine (opposite dorsal-fin ray)	9th	9th-10th	9th	9th-10th	9th
Origin of pelvic fin (opposite dorsal-fin spine)	1st-2nd	before 1st-1st	1st-3rd	before 1st-2nd	before 1st-2nd
Anal-fin elements	III, 12	III, 12	III, 12	III, 12	III, 12
Pectoral-fin rays	ii, 14	ii, 14	ii, 14	ii, 14	ii, 13-14
Total gill rakers	15-16	16-17	15-17	16-19	17-19
Lateral-line scales	30 + 2	29-31 + 2	30 + 2	29-30 + 2	29-30 + 2
Scales above lateral line	4-4.5	4.5	4.5-5	4.5	4-4.5
Scales below lateral line	12.5-13.5	11-12.5	11-13	11-13	11-13.5
Predorsal scales	32-33	19-31	**18**	**26-31**	19-33
Predorsal scales reaching	anteriorly to nostril	before anterior nostril	before or above anterior	above centre of orbit	above anterior nostril
Proportions (as percentage of SL)					
HL	38.6-38.7	38.3-40.2	**36.1-38.0**	**35.1-37.3**	36.3-39.0
Snout length	10.0-11.2	11.5-13.2	10.1-10.8	10.6-12.0	9.5-14.6
Maximum orbital diameter	7.8-8.6	7.7- 8.3	**8.7-9.6**	6.7-8.3	6.4-11.4
Body depth	39.8-43.8	36.3-41.1	**30.9-34.6**	**31.2-34.3**	**32.6-38.4**
Caudal-peduncle length	14.1-16.2	14.7-17.0	14.1-17.4	**13.6**	**12.4**
Caudal-peduncle depth	15.5-16.3	15.2-18.4	15.2-16.0	15.7-17.0	14.2-16.7
Predorsal length	42.1-42.4	40.0-41.8	38.6-40.3	**38.2**	**38.6**
Dorsal-base length	53.8-53.9	50.0-58.9	50.9-53.5	**46.3-51.2**	46.0-54.6
Dorsal-fin length	67.4-67.6	65.3-74.3	**63.4-67.2**	**62.7**	**59.3**
Dorsal-fin spine 1	6.8-7.0	5.7-7.8	**7.8-8.1**	6.0-7.7	5.6-7.1
Dorsal-fin spine 2	7.1-9.3	7.3-9.5	**9.5-10.3**	7.5-8.8	7.1-9.1
Dorsal-fin spine 12	11.0-13.3	13.6-15.9	**15.0-16.7**	13.1-14.8	9.6-14.7
Preanal length	62.9-66.0	62.1-66.3	63.1-63.9	**70.8**	**67.9**
Pre-anus length	60.2-61.2	59.9-62.0	**58.4-59.9**	**64.0**	–
Anal-base length	23.4-24.3	22.6-26.1	24.1-25.7	18.8-24.0	21.6-25.5
Anal-fin length	31.1-34.3	31.7-38.2	33.9-34.5	32.3	31.7
Anal-fin spine 1	6.5-8.4	6.8-7.4	6.6-8.1	6.4-7.5	5.4-7.2
Anal-fin spine 3	12.1-15.0	13.6-15.4	15.1-17.7	13.6-15.5	10.4-13.8
Pectoral-fin length	22.0-22.3	22.3-24.2	**23.5-25.5**	20.9-24.5	**22.7-24.4**
Pelvic-fin length	17.6-18.7	18.4-20.3	**21.1-22.7**	18.1-19.8	17.9-22.0
Caudal-fin length (top)	22.6	23.4-25.7	**26.1-26.8**	–	21.2-26.0
Caudal-fin length (middle)	22.3-22.5	22.6-26.7	**25.0-25.5**	21.4-23.1	21.4-25.4

three-five segments of equal length in *B. trilineatus*), and red blotch on pectoral-fin base (pectoral-fin base with crescentic black line in *B. trilineatus*); they differ from *B. leucosticticus* in having predorsal scales that reach anteriorly to in advance of the anterior nostril (at most to above the anterior nostril in *B. leucosticticus*), a total of 32-33 predorsal scales (at most 31 in *B. leucosticticus*), a higher body depth, a longer caudal peduncle, a longer predorsal length, dorsal base length and dorsal-fin length, a shorter preanal length and preanus length, and a different terminal phase colour pattern including interrupted lines on the sides of the body (uninterrupted in *B. leucosticticus*), and a red blotch on the pectoral-fin base (black in *B. leucosticticus*). Red Sea specimens of *B. rubrisos* differ from *B. paraleucosticticus* in having a total of 32-33 predorsal scales (18 in *B. paraleucosticticus*), a longer head, smaller eye, greater body depth, a longer but lower dorsal fin, a shorter caudal fin, and a different terminal phase colouration including interrupted lines on the sides of the body (uninterrupted yellow lines in *B. paraleucosticticus*), no black blotch anteriorly on the dorsal-fin membranes (black blotch present in *B. paraleucosticticus*), and a red blotch on the pectoral-fin base (black in *B. paraleucosticticus*).

Like other members of the subgenus *Peneverreo*, *B. rubrisos* is living on deep reefs. Such deep coral/rocky reefs exist in the Gulf of Aqaba where the Israeli specimens were collected (Brokovich, 2008). They extend from a depth of 65 m to a range deeper than 150 m.

Bodianus rubrisos is now known from three widely separated distribution areas in the northern Red Sea, the eastern Indian Ocean off Bali (Indonesia) and Arafura Sea, the Philippines, and Taiwan to Ryukyu Islands in the western Pacific (Fig. 2). This disjunct distribution range might be considered as artificial due to restricted collecting effort on deep reefs. However, as the distribution ranges in the Red Sea and the eastern Indian Ocean are separated by the occurrence of another species (*B. trilineatus*), the separation of the distribution ranges may be real.

Bodianus rubrisos has been collected on deep reefs at various water temperatures; the Bali location is situated in a cool upwelling zone of the eastern Indian Ocean, but the Red Sea temperatures are much warmer than that (the average temperature at 200 m depth off Bali is 14°C, but 22°C in the Red Sea according to Wyrtki, 1971: 76). Warm water masses seem to have no barrier effect on this species.

As the known distribution ranges are apparently widely separated, with a wide gap of approximately 10,400 km between the Red Sea population and the eastern Indian Ocean population, it would be important to perform genetic studies of this species when sufficient comparative material becomes available.

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